



T0260 Nephelometer Experiment (Nephex)

Technology Need

Traditional remote methods of measuring clouds, such as ceilometry or satellite imagery, only provide large-scale information about the edges of cloud layers. A nephelometer gives detailed data about the interior of planetary clouds, including size, density, and state of matter of cloud particles.

Test Apparatus

Nephex uses two lasers (1550 nm and 785 nm) with exterior line-of-sight to explore cloud particle properties. It includes on-board data processing.
Size: 1 CU;
Mass: 1.7 kg;
Power: 1.5W - Can be powered by the BEST-2's Tardigrade Power board.

Flight Requirements/Objectives

- Balloon flight allows Nephex access to cloud layers.
 - Flight time = hours to days
 - Nephex will operate at prescribed intervals throughout the flight, storing the data for later retrieval.
- Objective: in-situ observations of clouds within a planetary atmosphere at pressures between 0.01 bar and ~1 bar.

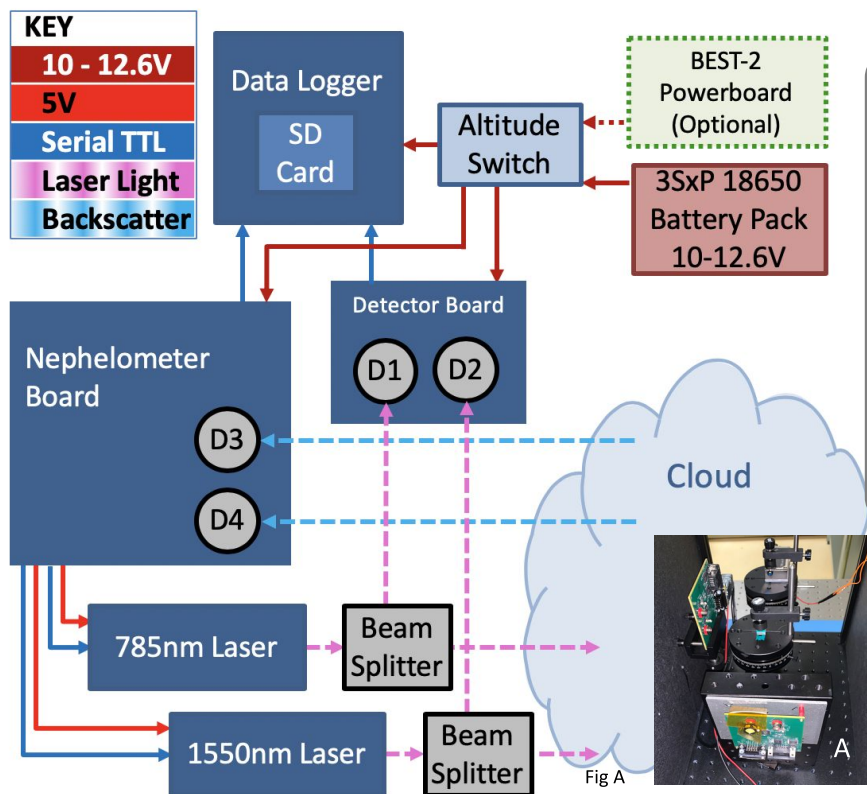
Technology Concept

Allows in-situ measurements of planetary cloud properties, providing data for cloud models and climate simulations.

Use of two wavelengths maximizes detection for the range of expected particle sizes. Use of a modulated laser pulse and autocorrelation function (dynamic light scattering) constrains the particle radius.

Technology Development Team

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Technology Advancement

Nephex has been validated in the lab (Fig A) and is TRL 4. Balloon flight will provide the relevant environment to demonstrate Nephex's in-situ particle measurements: multi-layered clouds with significant path lengths (>several meters), resulting in **TRL 5**.

Technology End Users

NASA's planetary investigations, NOAA's Atmospheric investigations